IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Biederman et al.

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Title: APPARATUS AND METHODS FOR COMBINING DATA

Proposed Listing of Claims (Revision B):

1. (currently amended): A method for ~~combin~~handling data ~~segments~~, the method comprising:

at a combiner node, establishing a flow between a first node and the combiner node;

at the combiner node, receiving data segments from the first node that are destined for a second node;

at the combiner node, combining and buffering the received data segments with previously buffered data segments from the first node, if present, until a first condition ~~other than an expiration of a timer~~ is met; ~~and~~

at the combiner node, sending at least a portion of the combined data segments to the second node when the first condition is met,

at the combiner node, receiving data from the second node that is destined for the first node;

at the combiner node, splitting the received data into a plurality of segments; and

at the combiner node, sending the segments to the first node,

wherein the received data segments are combined in the combiner node prior to being sent to the second node and wherein the received data is segmented in the combiner node prior to being sent to the first node so as to reduce processing and/or storage resources consumed by the second node.

2. (currently amended): A method for ~~combin~~handling data ~~segments~~, the method comprising:

at a combiner node, establishing a flow between a first node and the combiner node, wherein establishing the flow comprises having a set of Syn, Syn-Ack, Ack, Fin, Fin-Ack and Ack data exchanges;

at the combiner node, receiving data segments from the first node that are destined for a second node;

at the combiner node, combining and buffering the received data segments with previously buffered data segments from the first node, if present, until a first condition is met; ~~and~~

at the combiner node, sending at least a portion of the combined data segments to the second node when the first condition is met,

at the combiner node, receiving data from the second node that is destined for the first node;

at the combiner node, splitting the received data into a plurality of segments; and

at the combiner node, sending the segments to the first node,

wherein the received data segments are combined in the combiner node prior to being sent to the second node and wherein the received data is segmented in the combiner node prior to being sent to the first node so as to reduce processing and/or storage resources consumed by the second node.

3. (previously presented): A method as recited in claim 2, wherein the first condition is met when a combiner timer expires, the method further comprising:

waiting a predetermined amount of time and then determining whether there is congestion between the combiner node and the second node; and

when it is determined that there is congestion, increasing or resetting the combiner timer.

4. (previously presented): A method as recited in claim 2, wherein the first condition is met when a combiner timer expires, the method further comprising:

when a number of flows received into the combiner node changes, setting the combiner timer based on the number of flows.

5. (previously presented): A method as recited in claim 4, wherein the combiner timer is set to a selected one of a plurality of times, wherein each time selection is based on whether the number of flows has reached a particular threshold level.

6. (original): A method as recited in claim 1, wherein the first condition is met when a first received data segment includes a field that indicates whether the data segment is important.

7. (original): A method as recited in claim 1, wherein the first condition is met when a data length of at least a portion of the combined data is less than or equal to a window size indicated by the second node, wherein a maximum portion of the combined data that will fit within the indicated window size is sent to the second node.

8. (previously presented): A method as recited in claim 1, wherein data that travels between the first node and the second node has a first maximum data size and data that is traveling between the combiner node and the second node has a second maximum data size, the first maximum size being substantially smaller than the second maximum data size, wherein the combined data segments sent to the second node have an associated size that is less than or equal to the second maximum data size.

9. (original): A method as recited in claim 8, wherein the first and second maximum data size are selected from a group consisting of a first and second window size, a first and second maximum segment size, and a first and second maximum transmission unit.

10. (canceled): A method as recited in claim 1, further comprising:

at the combiner node, receiving data from the second node that is destined for the first node;

at the combiner node, splitting the received data into a plurality of segments; and

at the combiner node, sending the segments to the first node,

wherein the received data is segmented in the combiner node prior to being sent to the first node so as to reduce processing and/or storage resources consumed by the second node.

11. (original): A method as recited in claim 1, wherein the first condition is met when a last segment belonging to a same data group that was fragmented is received, wherein the combined data that is sent to the second node includes all of the segments of the same fragmented data group.

12. (original): A method as recited in claim 1, further comprising:

when out-of-order data segments are received, buffering the received out-of-order data segments with previously buffered data segments from the first node if present until missing data segments are received; and

reordering the out-of-order data segments after missing data segments are received prior to combining the re-ordered data segments with previously buffered data segments.

13. (currently amended): A method as recited in claim 1~~2~~, further comprising sending the received data segments substantially immediately without the first condition being met to the second node when the received data segments have ~~has~~ a relatively high priority.

14. (currently amended): A method as recited in claim 13, wherein the received data segments have ~~has~~ a relatively high priority based on information contained in the received data segments.

15. (original): A method as recited in claim 13, wherein the received data segments are combined with previously buffered data segments having a same priority level as the received data segments and the first condition is met when a timer associated with the same priority level expires.

16. (original): A method as recited in claim 15, wherein there are a plurality of timers each associated with a different priority level.

17. (currently amended): A router operable to ~~combine~~handle data ~~segments~~, the router comprising:

one or more processors;

one or more memory, wherein at least one of the processors and memory are adapted to:

at the router, establish a flow between a first node and the router;

at the router, receive data segments from the first node that are destined for a second node;

at the router, combine and buffering the received data segments with previously buffered data segments from the first node if present until a first condition ~~other than an expiration of a timer~~ is met; ~~and~~

at the router, send at least a portion of the combined data segments to the second node when the first condition is met,

at the router, receiving data from the second node that is destined for the first node;

at the router, splitting the received data into a plurality of segments; and

at the router, sending the segments to the first node,

wherein the received data segments are combined in the router prior to being sent to the second node and wherein the received data is segmented in the router prior to being sent to the first node so as to reduce processing and/or storage resources consumed by the second node.

18. (currently amended): A router operable to ~~combine~~handle data ~~segments~~, the router comprising:

one or more processors;

one or more memory, wherein at least one of the processors and memory are adapted to:

at the router, establish a flow between a first node and the router, wherein the established flow comprises a set of Syn, Syn-Ack, Ack, Fin, Fin-Ack and Ack data exchanges;

at the router, receive data segments from the first node that are destined for a second node;

at the router, combine and buffering the received data segments with previously buffered data segments from the first node if present until a first condition is met; ~~and~~

at the router, send at least a portion of the combined data segments to the second node when the first condition is met,

at the router, receiving data from the second node that is destined for the first node;

at the router, splitting the received data into a plurality of segments; and

at the router, sending the segments to the first node,

wherein the received data segments are combined in the router prior to being sent to the second node and wherein the received data is segmented in the router prior to being sent to the first node so as to reduce processing and/or storage resources consumed by the second node.

19. (previously presented): A router as recited in claim 18, wherein the first condition is met when a combiner timer expires, wherein the at least one of the processors and memory are further adapted to:

wait a predetermined amount of time and then determining whether there is congestion between the router and the second node; and

when it is determined that there is congestion, increase or resetting the combiner timer.

20. (previously presented): A router as recited in claim 18, wherein the first condition is met when a combiner timer expires, wherein the at least one of the processors and memory are further adapted to:

when a number of flows received into the router changes, set the combiner timer based on the number of flows.

21. (previously presented): A router as recited in claim 20, wherein the combiner timer is set to a selected one of a plurality of times, wherein each time selection is based on whether the number of flows has reached a particular threshold level.

22. (original): A router as recited in claim 17, wherein the first condition is met when a first received data segment includes a field that indicates whether the data segment is important.

23. (original): A router as recited in claim 17, wherein the first condition is met when a data length of at least a portion of the combined data is less than or equal to a window size indicated by the second node, wherein a maximum portion of the combined data that will fit within the indicated window size is sent to the second node.

24. (previously presented): A router as recited in claim 17, wherein data that travels between the first node and the second node has a first maximum data size and data that is traveling between the combiner node and the second node has a second maximum data size, the first maximum size being substantially smaller than the second maximum data size, wherein the combined data segments sent to the second node have an associated size that is less than or equal to the second maximum data size.

25. (original): A router as recited in claim 24, wherein the first and second maximum data size are selected from a group consisting of a first and second window size, a first and second maximum segment size, and a first and second maximum transmission unit.

26. (canceled): A router as recited in claim 17, wherein the at least one of the processors and memory are further adapted to:

at the router, receiving data from the second node that is destined for the first node;

at the router, splitting the received data into a plurality of segments; and

at the router, sending the segments to the first node,

wherein the received data is segmented in the router prior to being sent to the first node so as to reduce processing and/or storage resources consumed by the second node.

27. (original): A router as recited in claim 17, wherein the first condition is met when a last segment belonging to a same data group that was fragmented is received, wherein the combined data that is sent to the second node includes all of the segments of the same fragmented data group.

28. (original): A router as recited in claim 17, wherein the at least one of the processors and memory are further adapted to:

when out-of-order data segments are received, buffer the received out-of-order data segments with previously buffered data segments from the first node if present until missing data segments are received; and

reorder the out-of-order data segments after missing data segments are received prior to combining the re-ordered data segments with previously buffered data segments.

29. (currently amended): A router as recited in claim 17~~8~~, wherein the at least one of the processors and memory are further adapted to send the received data segments substantially immediately without the first condition being met to the second node when the received data segments have ~~has~~ a relatively high priority.

30. (currently amended): A router as recited in claim 29, wherein the received data segments have ~~has~~ a relatively high priority based on information contained in the received data segments.

31. (original): A router as recited in claim 29, wherein the received data segments are combined with previously buffered data segments having a same priority level as the received data segments and the first condition is met when a timer associated with the same priority level expires.

32. (original): A router as recited in claim 31, wherein there are a plurality of timers each associated with a different priority level.

the computer program product including a computer usable medium having computer readable code embodied therein, the computer readable code comprising computer code for

33. (currently amended): A computer program product comprising a computer readable medium on which is provided program instructions for ~~combin~~handling data at a combining device ~~segments~~, the ~~computer~~ program instructions ~~product~~ comprising:

~~at least one computer readable medium;~~

~~computer program instructions stored within the at least one computer readable product configured to cause a combining device to:~~

~~at a combining device,~~ instructions for establishing a flow between a first node and the combining device;

~~at the combining device,~~ instructions for receiving~~e~~ data segments from the first node that are destined for a second node;

~~at the combining device,~~ instructions for combining~~e~~ and buffering the received data segments with previously buffered data segments from the first node if present until a first condition ~~other than an expiration of a timer~~ is met; ~~and~~

~~at the combining device,~~ instructions for sending at least a portion of the combined data segments to the second node when the first condition is met,

instructions for receiving data from the second node that is destined for the first node;

instructions for splitting the received data into a plurality of segments; and

instructions for sending the segments to the first node,

wherein the received data segments are combined in the combining device prior to being sent to the second node and wherein the received data is segmented in the combining device prior to being sent to the first node so as to reduce processing and/or storage resources consumed by the second node.

34. (previously presented): A computer program product as recited in claim 33, wherein the computer readable medium is selected from a group consisting of magnetic media and magneto-optical media.

35. (currently amended): An apparatus for ~~combin~~handling data ~~segments~~, the apparatus comprising:

means for ~~at a combiner node,~~ establishing a flow between a first node and the combiner node;

means for ~~at the combiner node,~~ receiving data segments from the first node that are destined for a second node;

means for ~~at the combiner node~~, combining and buffering the received data segments with previously buffered data segments from the first node if present until a first condition ~~other than an expiration of a timer~~ is met; ~~and~~

means for ~~at the combiner node,~~ sending at least a portion of the combined data segments to the second node when the first condition is met,

means for receiving data from the second node that is destined for the first node;

means for splitting the received data into a plurality of segments; and

means for sending the segments to the first node,

wherein the received data segments are combined in the combiner node prior to being sent to the second node and wherein the received data is segmented in the combiner node prior to being sent to the first node so as to reduce processing and/or storage resources consumed by the second node.

36. (currently amended): A method as recited in claim 1, further comprising:

~~at the combiner node, sending an acknowledgement to the first node to confirm receipt of the data segments by the combiner node;~~

at the combiner node, establishing a second flow between the second node and the combiner node~~; and~~

~~at the combiner node, receiving an acknowledgment from the second node to confirm receipt of at least the portion of the combined data segments by the second node~~.

37. (currently amended): A router as recited in claim 17, wherein at least one of the processors and memory are further adapted to:

~~at the router, send an acknowledgement to the first node to confirm receipt of the data segments by the router;~~

at the router, establish a second flow between the second node and the router~~; and~~

~~at the router, receive an acknowledgement from the second node to confirm receipt of at least the portion of the combined data segments by the second node~~.

38. (currently amended): A computer program product as recited in claim 33, wherein computer program instructions stored within the at least one computer readable product configured to cause the combining device to:

~~at the combining device, send an acknowledgement to the first node to confirm receipt of the data segments by the combining device;~~

at the combining device, establish a second flow between the second node and the combining device~~; and~~

~~at the combining device, receive an acknowledgment from the second node to confirm receipt of at least the portion of the combined data segments by the second node~~.

39. (currently amended): An apparatus as recited in claim 35, further comprising:

~~means for at the combiner node, sending an acknowledgement to the first node to confirm receipt of the data segments by the combiner node;~~

means for ~~at the combiner node,~~ establishing a second flow between the second node and the combiner node~~; and~~

~~means for at the combiner node, receiving an acknowledgement from the second node to confirm receipt of at least the portion of the combined data segments by the second node~~.

40. (new): A method as recited in claim 1, wherein the first condition is met when a combiner timer expires.

41. (new): A router as recited in claim 17, wherein the first condition is met when a combiner timer expires.